Automated Energy, Inc.

Prophet Load Profiler

User Manual

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I. About the Load Profiler

The **LOAD PROFILER** begins in **Compare** mode, but many features are available while the Profiler is in **Compare**, **Aggregate**, or **Detail** Mode. The **Legend** and **Statistics** features, when selected, will reflect the commodities/meters in the **Graph** and **Data** tables. The **Slider Bar**, which can show potential cost savings, is only available while the Load Profiler is in the **Aggregate** Mode.

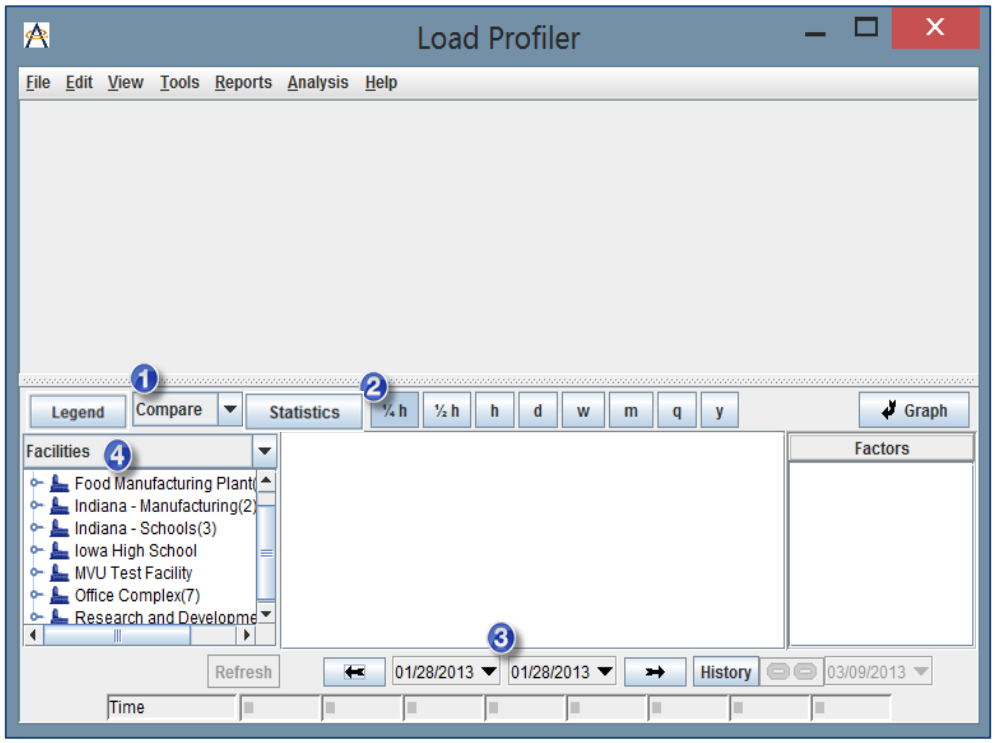
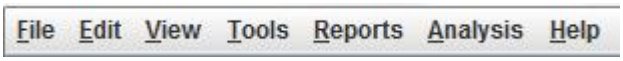


Figure I-1The initial default view of the LOAD PROFILER. The Meter Tree (#4) will be populated with all facilities associated with your login.

1. The **LOAD PROFILER** begins in Compare Mode
2. The default **Binning** selection is ¼ hour.
3. The Initial Date is the previous day.
4. All **Facilities** are shown with the number of meters in parenthesis

Menu Bar



- The File, Edit, and View options are similar to other Windows applications.
- Tools offer Admin options such as Rate editor and Report set-up options.
- Reports and Analysis lists the different Report options available using the Load Profiler data.

***Buttons** will turn from light grey to **dark** when selected.*

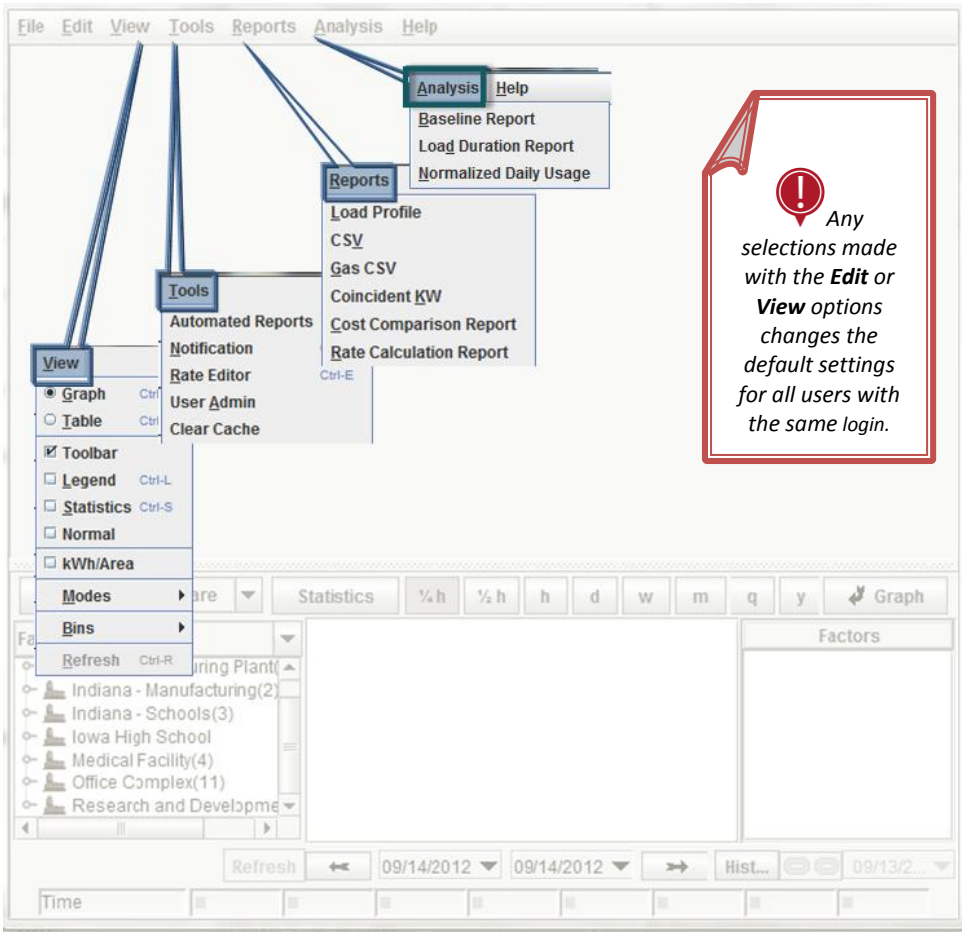


Figure I-2 Displays all options available for each menu item.

Main Features

Meter Tree

The Meter Tree window displays all your Facilities with an expansion switch, which when clicked will reveal all the commodities, by meter, associated with that facility. If

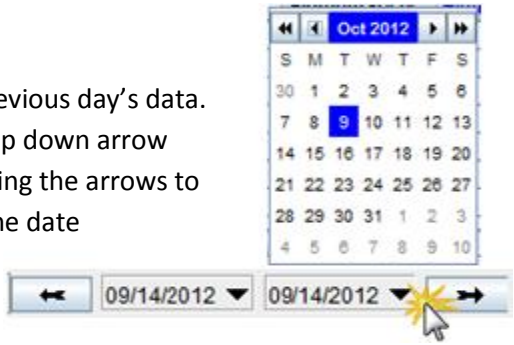
Figure I-3 Meter Tree

a facility has a sub-meter, it will have its own expansion switch. The number in parenthesis represents the number of meters associated with a particular facility**.** For example, in Figure 1**-3**, Indiana – Schools has three associated meters**.**

When you select a Facility and its meters, both the aggregate and the individual meter data will show up in the graph and data table.

- **Commodities** can be view by **Facilities** (default), **City**, **States**, **Regions**, **Meters**, **Utilities**, **Sub-Meters** or by a custom grouping.
- Information is available for a selected (highlighted) **Facility** or **meter** when right-clicked→ **Properties** →dialog box with selected **Facility/Account/Meter** information.
- To remove a meter from the **Graph**, click on the **Meter** in the **Databox** and it will turn a light color and disappear from the Graph.
- The **LOAD PROFILER** will need to be refreshed after any **Facility** or **Mode** change and after any **Date** change.

Date Selection

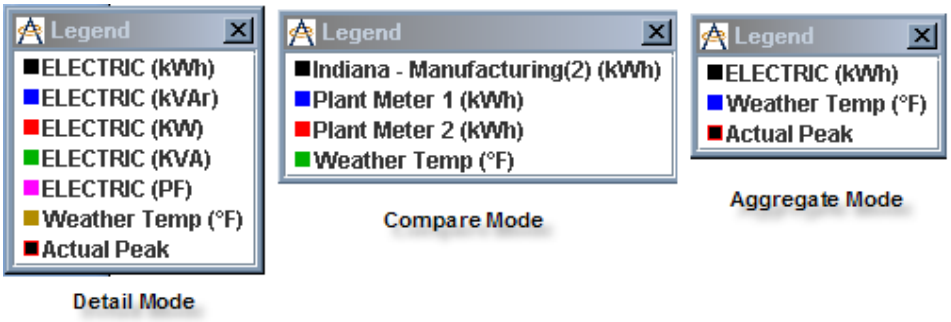


The **LOAD PROFILER** defaults to show the previous day's data. Change the date selection by clicking the drop down arrow beside the date to access the calendar, or using the arrows to the left and right to advance or move back the date by one day.

- If you select a **LoadProfile** date range of 9/14/12 through 9/18/12, the ***last*** **Meter Reading** will be **Time Stamped** as 9/19/12 00:00.
- If you select a date range of 9/01/12 through 9/30/12, the ***last*** Meter Reading will be **Time Stamped** as 10/1/12 00:00.

Legend

- When selected, the **Legend** will appear as a floating box on your screen. The selection below shows the difference in contents reflected in the **Legend**.



The Data Bar at the bottom of the screen displays the coordinating colors and the meter data as cursor moves along the bar.

Figure I-4 In the Meter Tree, Indiana-Manufacturing and its two meters are selected. The colors in the legend correspond with the lines on the Graph and the Data Table headings.

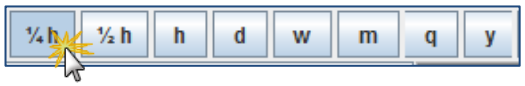
Binning Intervals

***Intervals** are for the PAST 15 minutes.*

For example,

00;15	1st 15 min of usage
00:30	2nd 15 min of usage
00:45	3rd 15 min of usage
01:00	4th 15 min of usage

There are 96-meter reads per day occurring, in 15-minute intervals which is the **LOAD PROFILER** default setting. .



To change the **Bin** selection, simply click on the desired interval to select and the **Graph/data** screens will automatically update to reflect interval choice.

Note: The date range on the date bar must be large enough to accommodate the Bin selection.

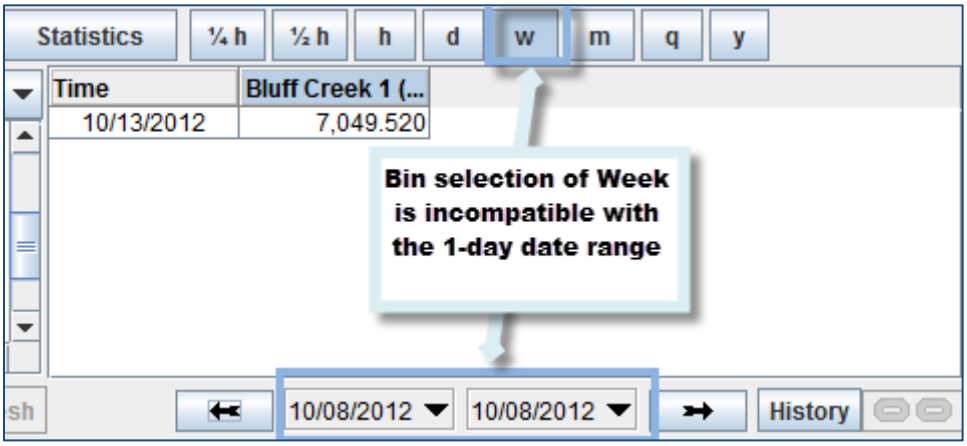


Figure I-5 Shows the Binning selection as "week" but the date selection is only one day.

Contributing Factors

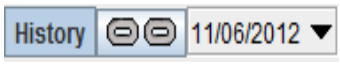
Contributing Factors are meter specific. This is data that can have a significant effect on your commodity usage. When you select a Factor, its data appears in the data table and Graph. The **Contributing Factor** will also be listed in the **Legend**. This is consistent in the **Compare**, **Aggregate,** and **Detail** modes.

Factors
Cooling Deg Days
Heating Deg Days
Relative Humidity
Weather Temp
Wind Chill

Contributing Factor knowledge may give the user the ability to control (reduce) the commodity usage.

The current Temperature and Forecasts for the upcoming five days are imported several times each day from AccuWeather, and the forecast is recalculated after each update.

History & Chain Feature



Selecting the **History** button (button turns dark) allows the **LOAD PROFILER** to view **any time length** in the Graph and data table to compare data.

- Selecting the **History** button activates the **Chain** button and reveals the **History** date selection.
- The **History** button places the data from the chosen date from the same selected meters/commodity in the **Data Table** and on the **Graph**.
- The **Chain** button links the **History** date and the current selected date for synchronized scrolling for direct comparison of data between past and present date ranges.

History

To use the **History** feature, click on the **History** button and select the Past date and **Refresh**.

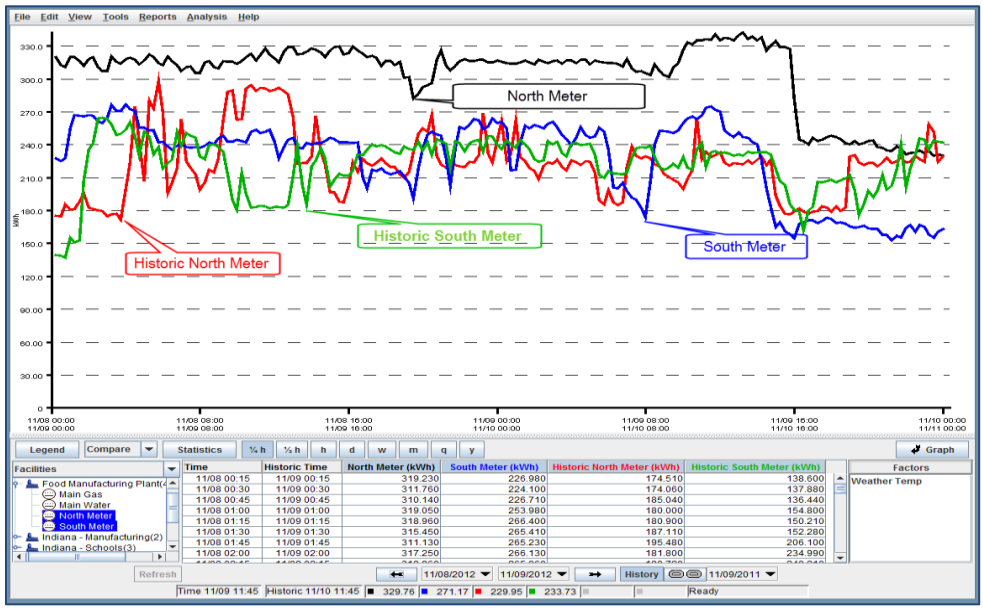


Figure I-6 Returned Load Profile for two selected meters and History button active

The historic data for each meter will appear as a separate line on the **Graph** and in the **Data Box** for each meter selected. Ex. the North meter is black and *Historic* North is red, etc.

Chain

To use the **Chain** feature the **History** button must be active.

- Click the Chain button (when selected Graphic will change from to and linking the current dates 10/03/2012 10/03/2012 with the **History** date 10/03/2011
- Use the back and advance arrows to scroll dates in synchrony.

Zoom

The **Zoom** feature expands a selected time frame within the Graph.

To use the **Zoom**,

1. Place the cursor at the desired starting point along the bottom of the Graph.
2. While holding the **left** mouse button, drag the **cursor** to the desired end point and release.
3. The **Graph** view changes to reveal the profile of the expanded time frame.
4. Clicking anywhere in the **Graph** returns the **display** to the original setting

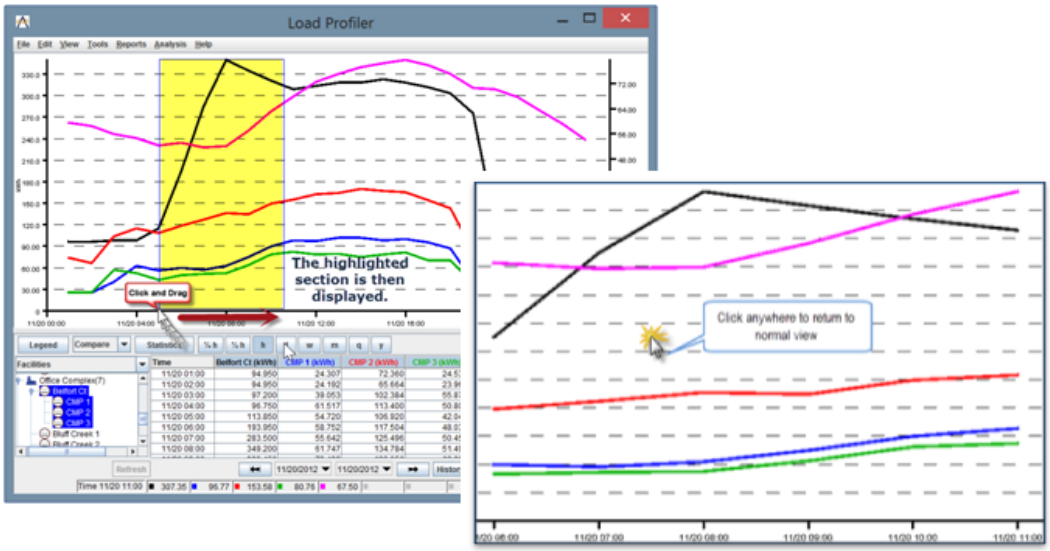


Figure I-7 The second screen is the expanded view of the highlighted area..

Forecasting

This feature allows you to set the "through" date up to five days (including today) into the future. The graph will predict what the load may be for tomorrow and the next several days. In Figure I-8 both the meter read and NORM graph lines merge and become lighter in color. Only the Temperature Line does not separate the Forecast Data from the Real Data.

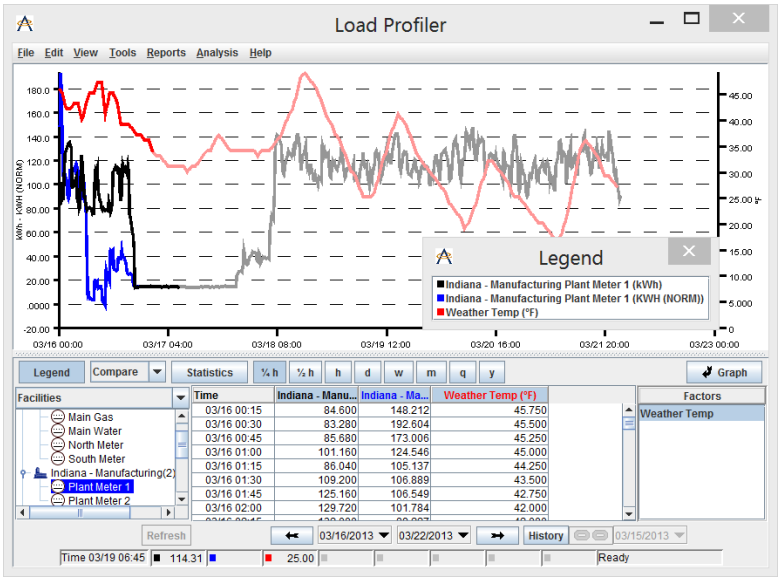
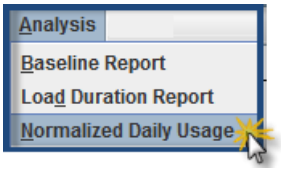


Figure I-8 Returned Load Profile for Future dates

Analysis Features

Normalized Daily Usage



From the Analysis Menu Tab, select Normalized Daily Usage to access this feature. With this report you can quickly see how each day differs from other days of the week. In Figure I-8, each day's kWh is "normalized" as compared to its weekly average. For example, if the average weekly usage is 200 kWh and a given day's usage is 1,000 kWh then the normalized daily usage is +1,000 kWh.

When looking at the chart in Figure I-8 you may expect all Mondays to be the same, all Tuesdays to be the same, etc. barring any unusual circumstances such as holidays that occur on a particular day. If some days exhibit a pattern that is higher or lower than the same days in other weeks, then you should investigate the reasons. Looking at the above example, we can make the following observations:

- Some of the weekend days are higher than the other days even though they may be near or below the weekly average, so you may want to address this and try and keep it from happening.
- These readings are more reasonable and close to those expected.
- It appears that some equipment is running late into the evening hours and in this case all night long.

There may be other circumstances that create unusually low readings compared to other weeks during the month and you should take this into account when interpreting the Normalized Daily Usage.

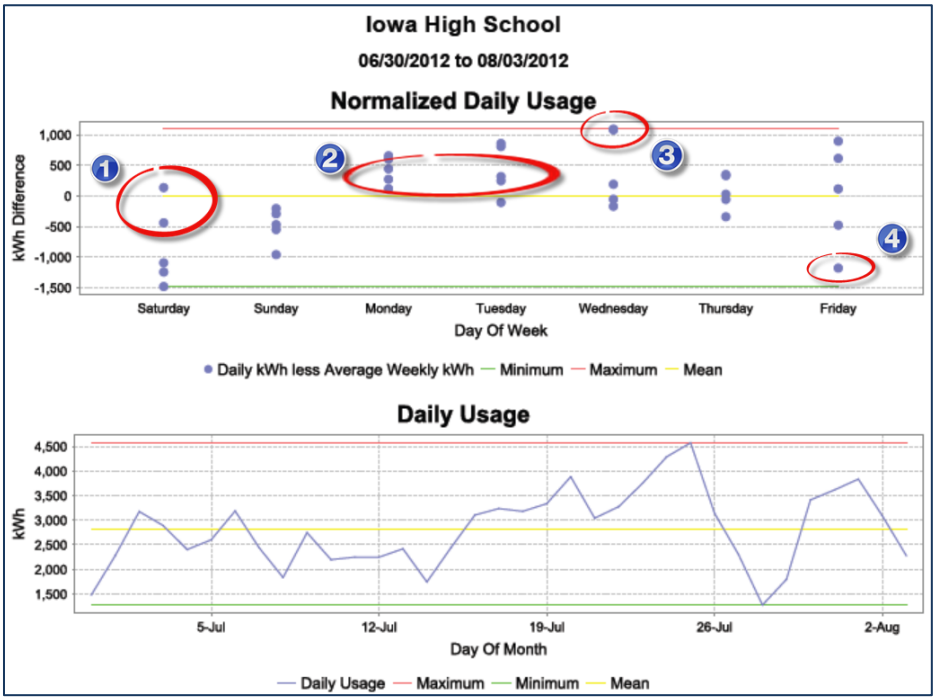
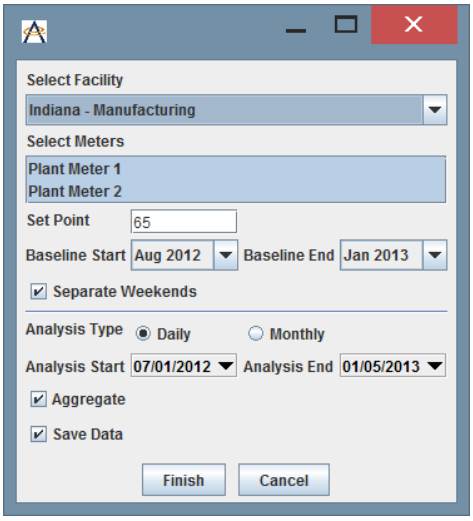


Figure I-9 Normalized Daily Usage for High School

Baseline



The Baseline (Analysis) Feature creates a usage model for your facility based on outside ambient temperature. You select a particular year and the energy used based on degree-days is calculated along with pertinent information so that you can use the model going forward to better manage energy consumption. The output includes the formula used to calculate the baseline and the percentage of energy use that can be attributed to temperature. It also separates weekday days from weekend days and allows you to determine the baseline temperature that the model will use. You can use the Baseline Feature to:

- Determine energy savings from energy efficiency improvements such as thermostat setbacks, lighting retrofits, or equipment upgrades.
- Benchmark a facility for weather and to compare energy use and costs on between different time frames.
- Provide a more accurate prediction of future energy use based on outside temperature.

- Insure your facility's mechanical systems are performing as originally commissioned with Constant Commissioning.

To see example, go to Baseline in the APPENDIX – REPORT SAMPLES.

Load Duration Curve

The Load Duration Curve is a quick look at your demand usage for both weekday days, weekend days and combined weekend and weekday days. It clearly shows how much your peak demand is and the percentage of time that it occurs – the goal being to minimize the peak as much as possible.

To see an example, go to Load Duration in the APPENDIX – REPORT SAMPLES.

II. Using the Load Profiler

Compare Mode

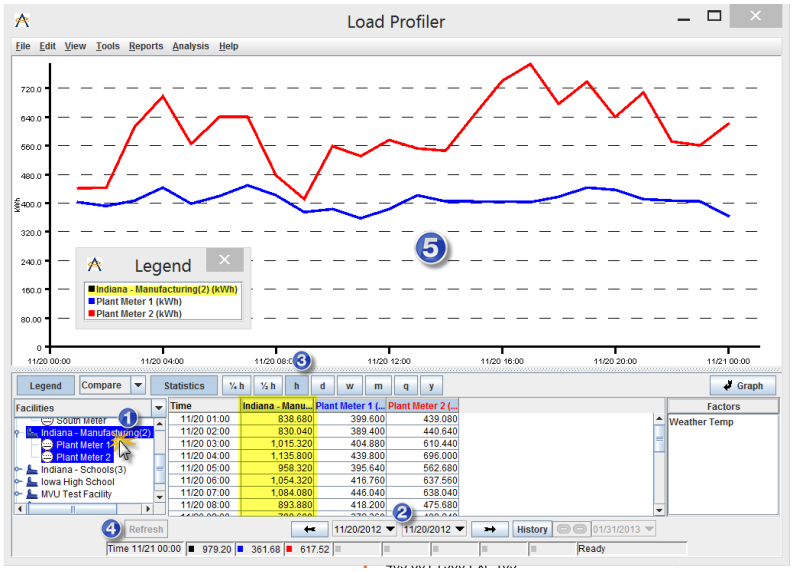


Figure IIII-1Returned Load Profile for Indiana-Manufacturing. The Facility is selected in the Meter Tree but deselected in the Data Table so it is not represented in the Graph

Single Facility-

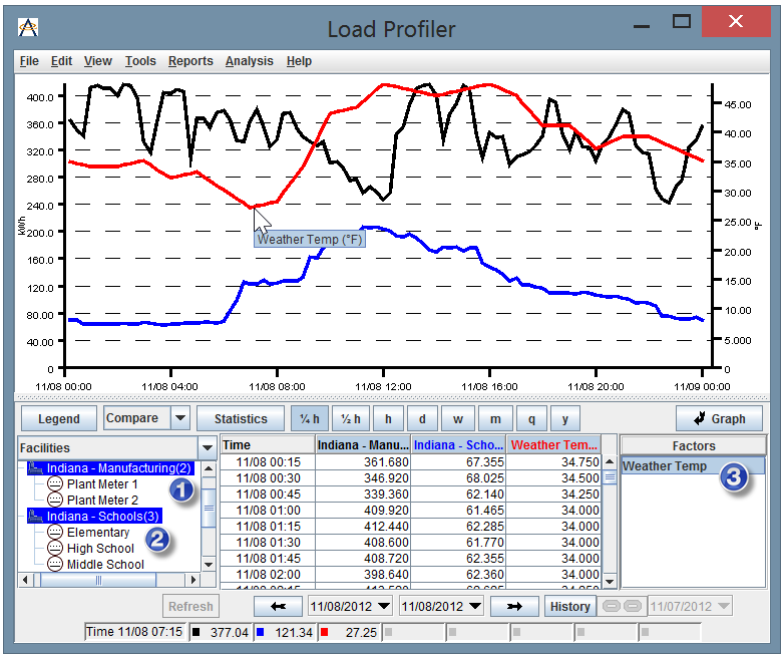
When selected, **Indiana-Manufacturing** *displays the* **Aggregate** *of its two meters.*

1. Make **Facility/Meter** selection (Use the Control/left-click option to make multiple selections) and Refresh.
1. Select **Date** Range –In this case, the range is one day.
3. Select Binning Options – In this example, the choice is the default of ¼ h. (If Day, Week, Quarterly, etc. is selected the date range must be large enough to reflect the bin selection.)
3. Refresh (Refresh can be accomplished three different ways: 1. On Menu Bar - View→☑Refresh; 2. Refresh Button; 3. Right-click Facility selection-Refresh).
5. The Graph and Data windows now display the selected data.

Use the Legend to identify **Graph** lines or place the cursor on a line for approximately 3 seconds and the name will appear. The colors of the lines will coincide with the colors of the meter name in the **Legend**, the **Data** box, and the **Data Bar** at the bottom of the screen.

Multiple Facilities

Compare two or more **Facilities**. When displayed, the **Statistics** for each **Facility** are the combined total for their **meters**. See Statistics for more information.



Compare *for two or more items displays the* **Aggregate*** *of each*

Figure II-2 Returned Load Profile for both Indiana Facilities in the Meter Tree

1. Select the first Facility.
2. Hold Ctrl, select second (or more) Facility.
3. In the above example, the contributing **Factor** of Weather Temp is also selected and displayed as the red line on Graph

Aggregate Mode

Shows the total of the selected commodities selected.

- Using the same example as above, but with **Aggregate** active, the Indiana-Manufacturing and Indiana-Schools meter data are combined in the ELECTRIC (kWh) column.
- **Statistics** for selected Facilities are the combined total of both. See Statistics-**Aggregate** for more information.
- While the **LOAD PROFILER** is in Aggregate mode, the Slider Bar is active.

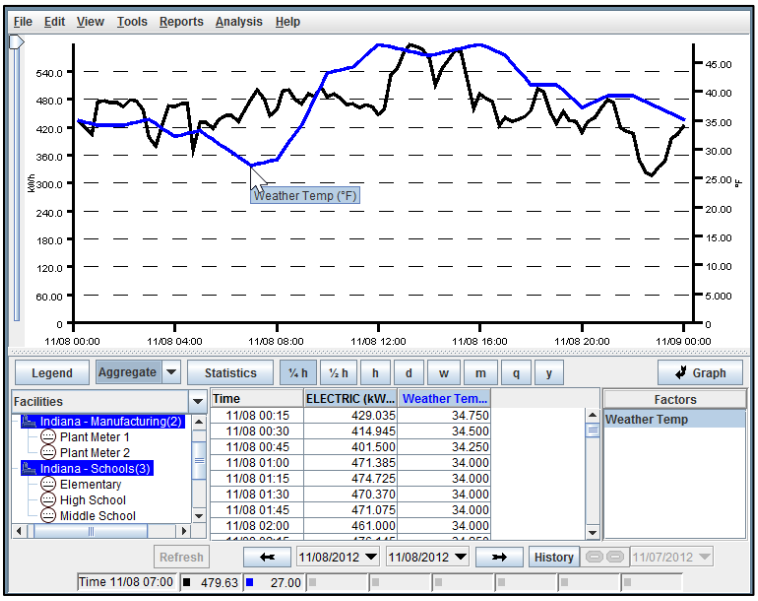


Figure II-3 - Returned Load Profile in Aggregate mode

Slider Bar

The information displayed on the Slider Bar Line is an **Above/Below Display** showing:

1. Percentage of kilowatt (kWh) demand reduction.
2. Dollar amount of potential savings for percentage of kWh reduction.
3. kWh reduction associated with the displayed percentage.
4. Amount of time control required to achieve the reduction for the displayed percentage.

Note: Monetary Value is based on rates in Rate Editor. If more than one rate is loaded into the Rate Editor, rate must be selected.

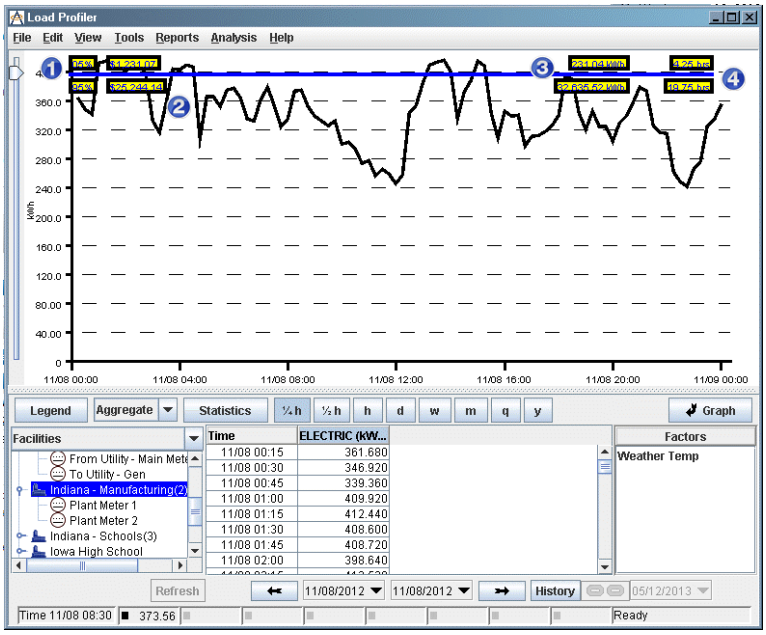


Figure III-4 Returned Load Profile in Aggregate mode with Slider Bar active.

Statistics

Clicking the Statistics button will display the Consumption **Statistics** box with the associated meters. Select Commodity (Gas, Electric, or Water, depending upon the Facility) to display data.

*If the kilowatt demand (kW) is displayed by either the **d** = day; **w** = week, **m** = month, **q** = quarter, or **y** = year, then the kW in the Statistics and the kW listed in the Data Table will be shown as the average hourly demand for the time period.*

Consumption Statistics will also change with the selection of any of these Buttons:

- **1/4 h** = 1 / 4 hour(15 minutes); **1/2 h** = 1 / 2 hour(30 minutes); **h** = hour(60 minutes)
- **d** = day;**w** = week **m** = month; **q** = quarter; **y** = year
- **From – Through** Date Range
- **Zoom** Feature

For **Electric**, the previous example is for the

- **Total usg = Total Usage**: for the Period (From-Date thru Through-Date).
- **Avg usg = Average Usage**: (based on all intervals).
- **Peak day = Peak Usage** day at date.
- **Min day: = Minimum Usage** day at date.
- **MCF = 1,000 Cubic Feet**.
- **Energy**

Detail Mode

When in **Detail** mode, the Load Profiler displays all the related aggregate statistics in the **Data** table, and the ELECTRIC (kWh) in the Graph area. To view larger amounts of data, click Graph to switch the **Graph** and **Data** tables between the two display areas. Your screen will look similar to the example in Figure II-5.

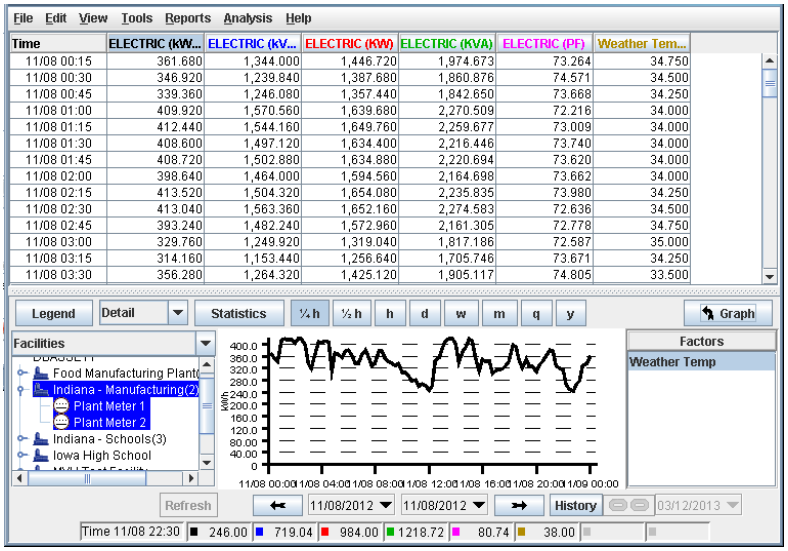


Figure II-5 Returned Load Profiler in Detail Mode with Graph and Data Table areas switched.

III. Getting the Most from your Load Profiler

Automated Reports

These reports allow you to receive daily demand and usage data for selected Facilities/Meters and provide comparison to the same time period of the previous year. To create a new Report, simply click on the Setup Wizard button and follow the step-by-step instructions. To view a sample report, go to Automated Report Sample in the *APPENDIX – REPORT SAMPLES*.

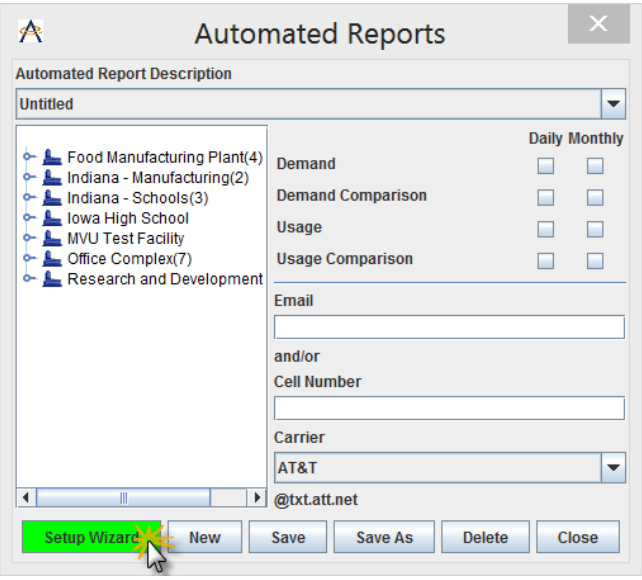


Figure III-1 Initial Automated Report dialog box

Notifications

These are daily reports where you create your own settings establishing warning guards and alerts for a ***specific*** Commodity. The Notification results (failures) are based on the following criteria:

Consumption can be electric kWh, gas MCF, water Gal, etc.

- Low Reading – based on Consumption
- High Reading – based on Consumption
- Zero Consumption
- Percentage either for the Above or Below Normal kWh usage.
- Number of consecutive periods

The **Load Profiler** processes notifications every morning from the ***previous*** day's data. If one or more tests fail, your chosen recipients will receive an e-mail containing the failures. If all four tests pass, no e-mail will be sent.

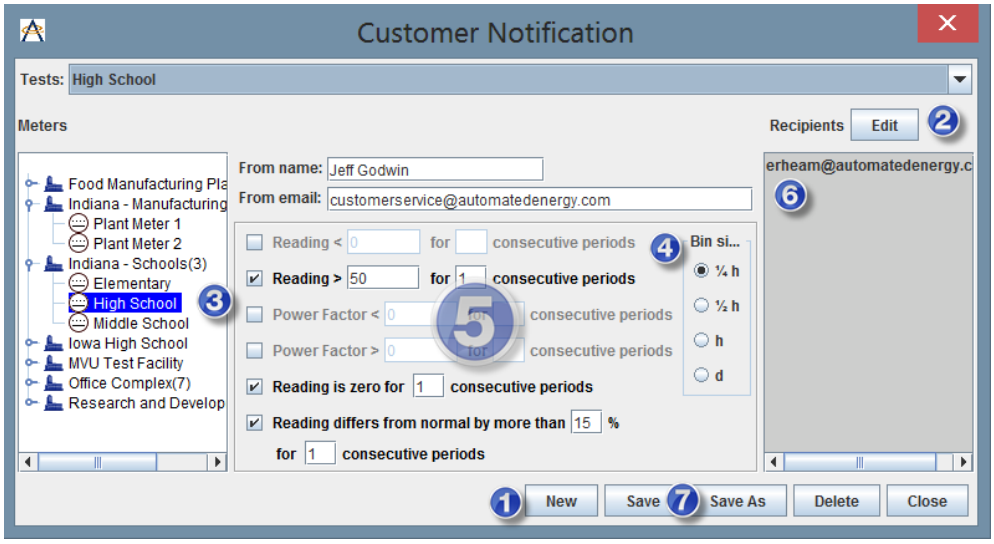


Figure III-2Automated Report Dialog Box

To create a Notification for a selected Commodity:

1. Click on New, which will create an Untitled_1 for a New Customer Notification and default the Bin size to the lowest setting.
2. Establish your Recipients.
3. Select your Facilities and/or Meters for this Customer Notification.
   Note: This is an Aggregate of your selected Facilities/Meters.
4. Adjust the Bin size to the desired interval.
5. Select your desired tests the Notification is to perform. At least one is required.
   - ☑ **Reading <**establishes a Low Reading threshold with your consecutive periods setting.
   - ☑ **Reading >**establishes a High Reading threshold with your consecutive periods setting.
   - ☑ **Reading is Zero** for your consecutive period setting.
   - ☑ **Reading differs from Norm** based upon your desired percentage of the Normal kWh Usage and for your specified consecutive intervals.

   Note: An Error Message will display if Facility and/or Meter selections do not have kWh readings.

To view the Normal kWh on the Menu →View →☑ Normal; temperature is included in the algorithm

6. Select your recipients from those displayed.
6. Click Save. Enter a meaningful name for the new Notification up to 30 characters (ex. High School 50-15, based on the selections above.)To view a sample Notification, go to Notification sample in APPENDIX – REPORT SAMPLES.

Reports

The information on the Reports is directly related to the display selections on the **LOAD PROFILER** screen. Select Reports to access menu**:**

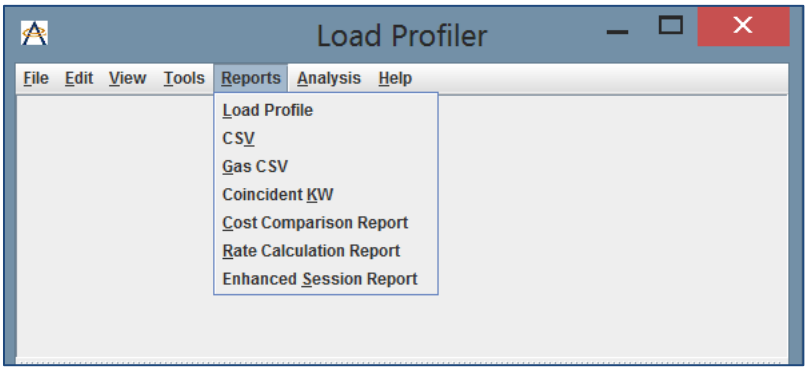


Figure III-3 Displays LOAD PROFILER Report options.

1. **Load Profile** Report: This report provides a Load Profile Chart and Statistics.

2. Load Profile **CSV** Report:
   - Save table in CSV file (comma separated values); which can be Opened or Saved into a spreadsheet.
   - All items that are in the **Load Profile Data Table** will be displayed to either include or exclude from the CSV file. The data is based on the "**From–Through" Date Range** or "the first – last of" data if the **Zoom** has been performed.
   - The << button moves all selections to the **Include** side.
   - To move an item from either side, click on the item and use the appropriate arrow.

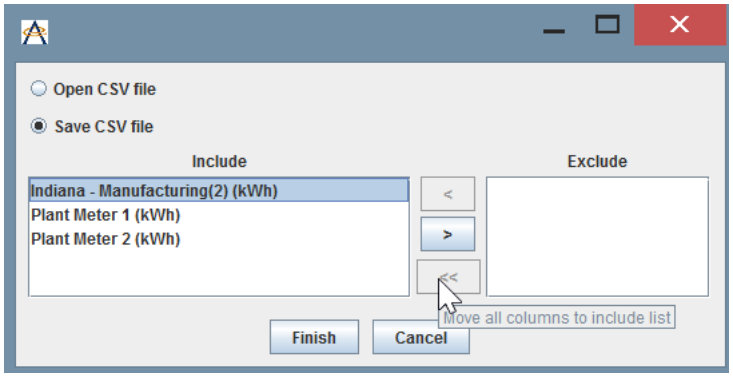


Figure III-4Displays the initial (kWh) CSV selection dialog box.

3. Load Profile **Gas CSV** Report:

   The **Gas** CSV Report shows gas usage based on the standard Henry Hub time zone. This screen works like the above CSV Report.

   Note: The "From – Through" calendar dates are **always** used. The Zoom feature has no effect on this Gas CSV report.

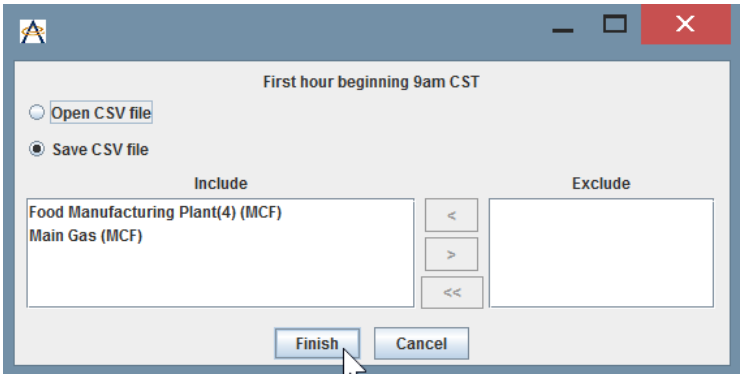
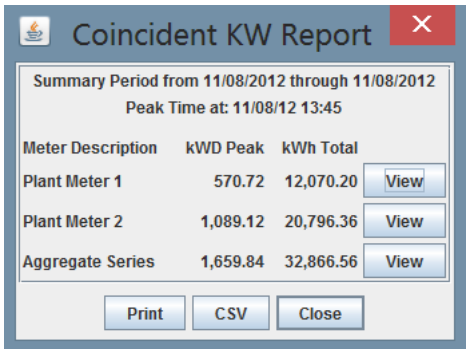


Figure III-5Displays the dialog box for Gas CSV selection.
Note: The Reading time is at top of box.

4. **Coincident KW** - Summary Report: Provides a Coincident KW Summary for the selected time period.



See Coincident KW - Summary Report: Provides a Coincident KW Summary for the selected

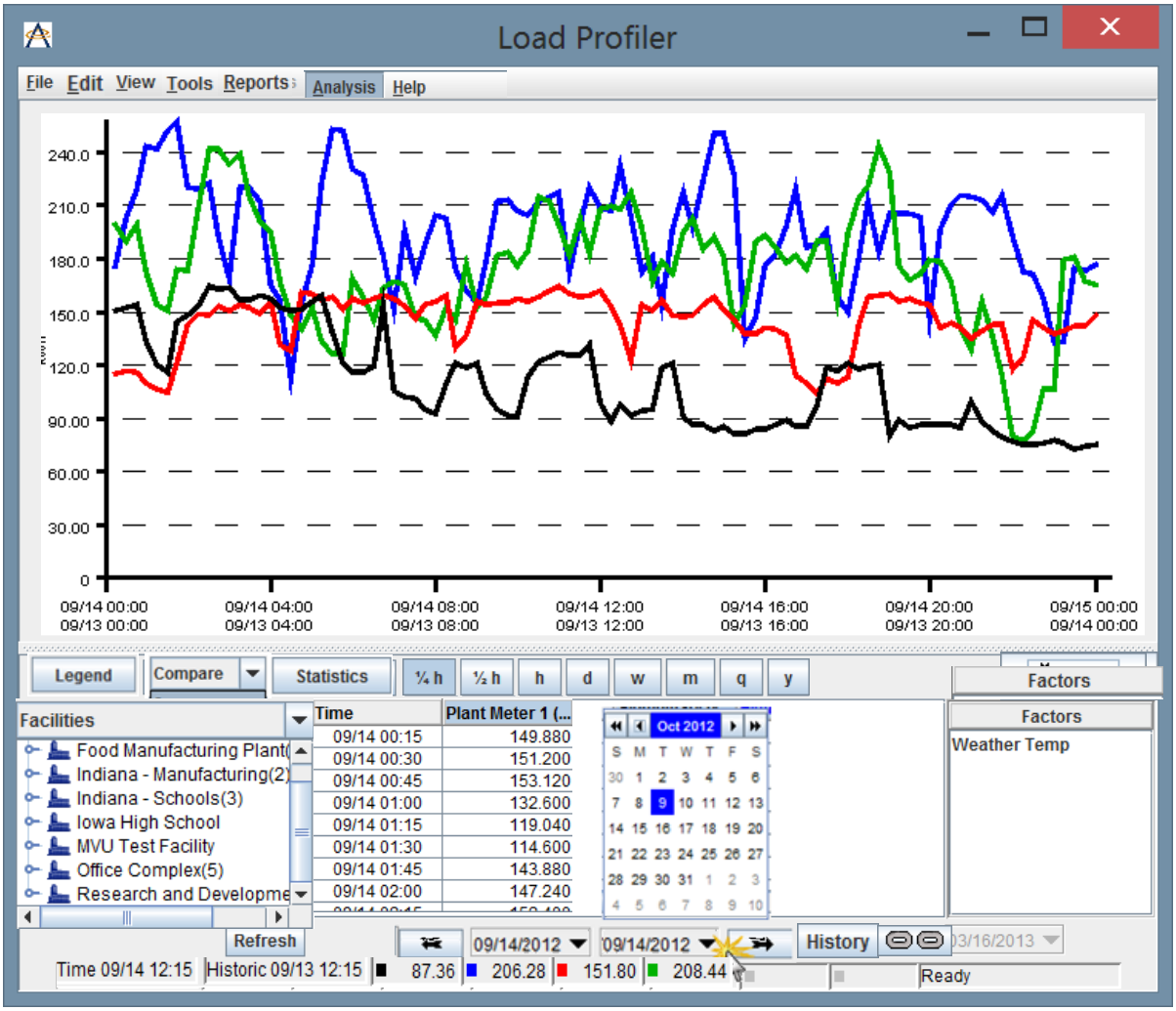
5. **Cost Comparison Report**: Provides a comparison of costs using selected rates (Please see the Rate Schedule Entry Doc.)

- If one rate is selected it will be printed on the Report.
- If two or more are selected a Cost Comparison Report (Chart) is displayed.
- By clicking the headings, the Rate Names will give a variety of choices or reports.
- To go back use the X (close) in the upper right corner.

Please see ***APPENDIX – REPORT SAMPLES*** to view all Report Samples.

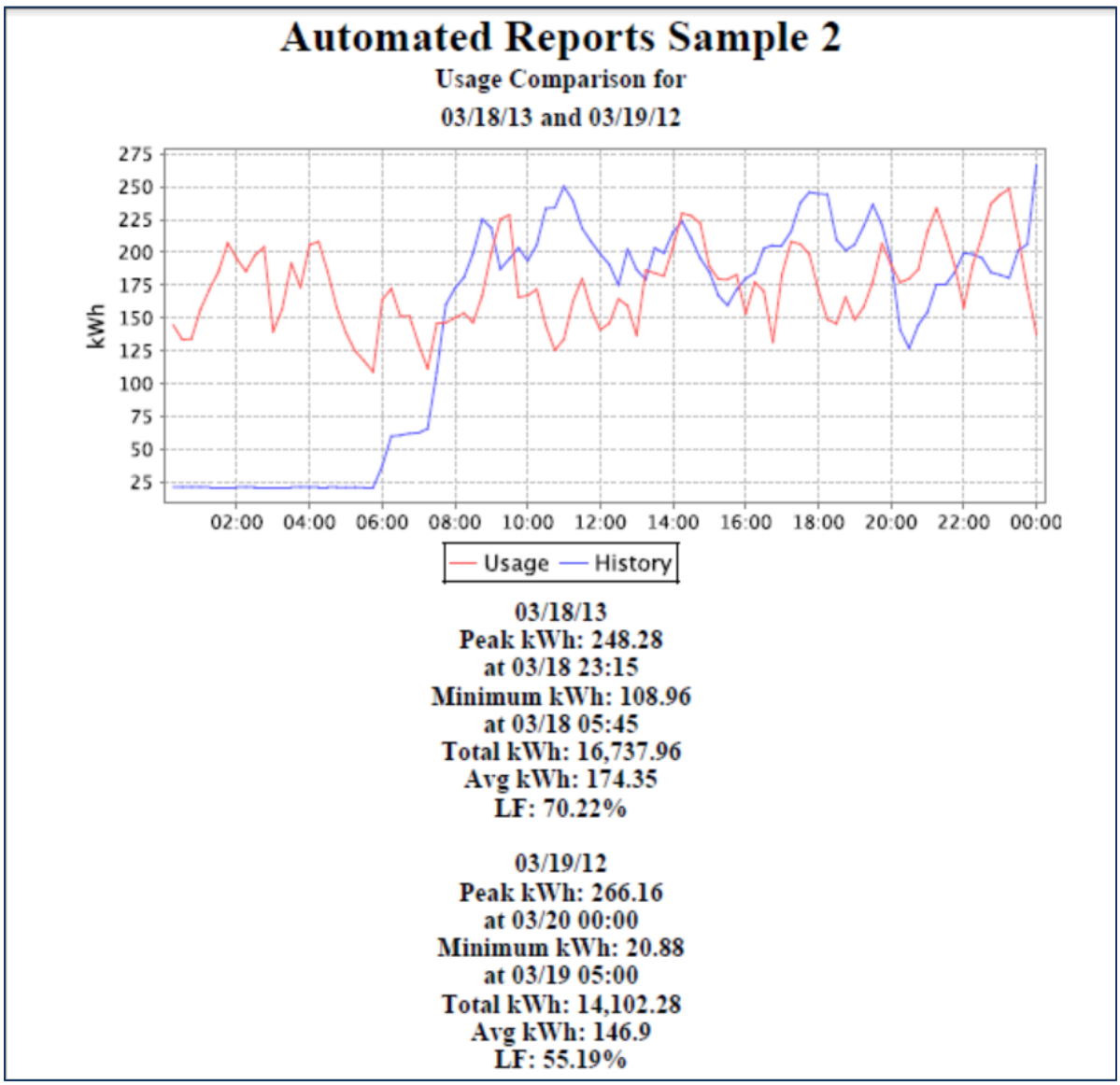
IV. Load Profile Map

Load Profile Map contains quick links to the text. Move the mouse over parts of the screen to reveal short cuts.



APPENDIX – REPORT SAMPLES

USAGE COMPARISON



BASELINE

Energy Vs Weather Regression Analysis

Indiana - Manufacturing

Plant Meter 1

Mulivariate Model Formula - Week Days

kWh=386.13CDD+64.58HDD+190575.22 (R2=0.5348)

Month	kWh	CDD	HDD	Adj kWh	Unexplained	% Unexplained
Aug 2012	281914	229.6	0	279227	2687	0.95
Sep 2012	209289	67.3	50.6	219818	-10529	-5.03
Oct 2012	234614	3.6	264.2	209013	25601	10.91
Nov 2012	229797	0	537	225254	4543	1.98
Dec 2012	188364	0	581.7	228137	-39773	-21.11
Jan 2013	261510	0	827.9	244039	17471	6.68

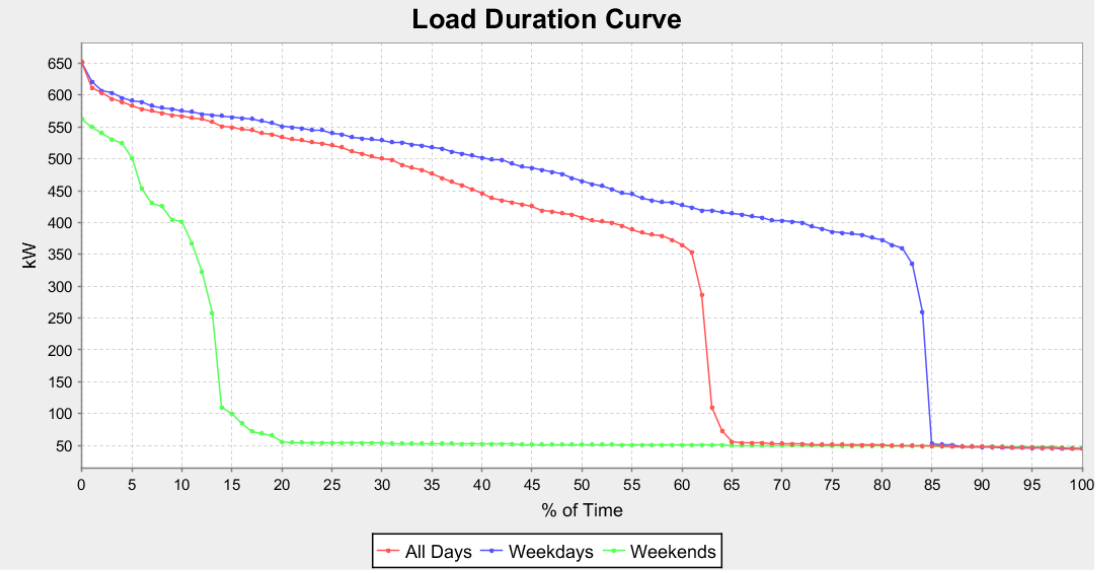
53.5% of the usage for the selected baseline period. is likely due to weather

LOAD DURATION CURVE

Plant Meter 1

11/02/2012 to 11/24/2012

Demand (kW)	Time	Day of Week
651.96	11/19/2012 12:00 PM	Monday
645.48	11/19/2012 07:00 AM	Monday
642.48	11/19/2012 11:00 AM	Monday
625.08	11/05/2012 12:00 PM	Monday
620.88	11/14/2012 07:00 PM	Wednesday



NOTIFICATION SAMPLES

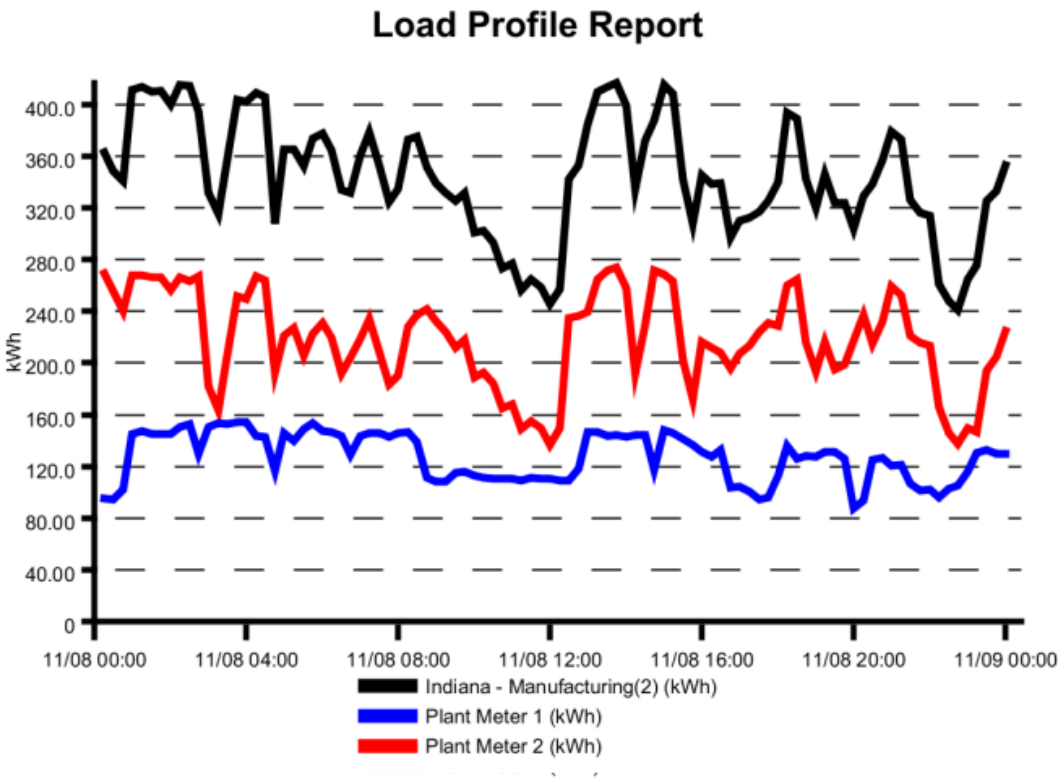
From:	**Jeff Godwin <customerservice@automatedenergy.com>**
Date:	**Sunday, March 31, 2013 6:02 AM**
To:	**jgodwin@automatedenergy.com**
Subject:	**Alert Service Notification**
Size:	**2 KB**

```
Notification Test
Selection: Bluff Creek 1

Maximum set point: 25.0, Consecutive failures: 1
Occurred:
 - March 30, 2013 from 12:15 AM to 12:00 PM


Powered by AutomatedEnergy.com
```

LOAD PROFILE REPORT SAMPLE



Reporting Period: From 11/08/2012 to 11/08/2012

Selection: Indiana - Manufacturing(2), Indiana - Manufacturing: Plant Meter 1, Indiana - Manufacturing: Plant Meter 2

Indiana - Manufacturing(2)

Meter Reading Statistics

Max (¼ h) Demand	1,659.840 KW at 11/08 13:45	Peak ¼ hour	414.960 kWh at 11/08 13:45
Min ¼ hour	239.520 kWh at 11/08 22:45	Total	32,866.560 kWh
Avg	342.360 kWh	LF	82.50%
Estimated #s C02	68,954.043		

Plant Meter 1

Meter Reading Statistics

Max (¼ h) Demand	612.000 KW at 11/08 04:00	Peak ¼ hour	153.000 kWh at 11/08 04:00
Min ¼ hour	86.280 kWh at 11/08 20:00	Total	12,070.200 kWh
Avg	125.731 kWh	LF	82.18%
Estimated #s C02	25,323.280		

Plant Meter 2

Meter Reading Statistics

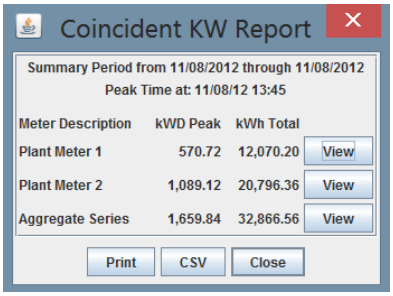
Max (¼ h) Demand	1,089.120 KW at 11/08 13:45	Peak ¼ hour	272.280 kWh at 11/08 13:45
Min ¼ hour	135.120 kWh at 11/08 12:00	Total	20,796.360 kWh
Avg	216.629 kWh	LF	79.56%
Estimated #s C02	43,630.763		

CSV (Comma Separated Value) Report

The report is exported and saved in an Excel spreadsheet which can be used for your use.

	A	B	C
1	Time	Plant Meter 1 kWh	Plant Meter 2 kWh
2	11/8/2012 0:15	93.84	267.84
3	11/8/2012 0:30	92.76	254.16
4	11/8/2012 0:45	100.8	238.56
5	11/8/2012 1:00	143.64	266.28
6	11/8/2012 1:15	145.8	266.64
7	11/8/2012 1:30	143.52	265.08
8	11/8/2012 1:45	143.88	264.84
9	11/8/2012 2:00	143.88	254.76
10	11/8/2012 2:15	149.04	264.48
11	11/8/2012 2:30	151.32	261.72
12	11/8/2012 2:45	127.92	265.32
13	11/8/2012 3:00	149.28	180.48
14	11/8/2012 3:15	152.28	161.88
15	11/8/2012 3:30	151.08	205.2
16	11/8/2012 3:45	152.52	249.84
17	11/8/2012 4:00	153	247.92
18	11/8/2012 4:15	141.84	265.32
19	11/8/2012 4:30	141.6	262.8
20	11/8/2012 4:45	115.2	190.8
21	11/8/2012 5:00	144.48	219.6
22	11/8/2012 5:15	138.24	225.48
23	11/8/2012 5:30	147.12	203.88
24	11/8/2012 5:45	151.8	220.68
25	11/8/2012 6:00	145.92	229.8
26	11/8/2012 6:15	144.96	217.68
27	11/8/2012 6:30	142.2	190.2
28	11/8/2012 6:45	127.32	202.92
29	11/8/2012 7:00	142.08	216.96
30	11/8/2012 7:15	144.12	232.92
31	11/8/2012 7:30	144.12	207.12
32	11/8/2012 7:45	141.48	181.56

COINCIDENT KW REPORT



Click View for Plant Meter 1 gives you